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ABSTRACT

This paper describes how four classes of high school students were introduced over a 2-year period to the concepts and terminology of online bibliographic searching, instructed to formulate their own search strategies, and received the opportunity to observe their strategies executed by a skilled searcher on various selected databases. It also examines and evaluates the methods employed and the students' achievement level responses to the course. Sixty-seven college bound seniors with no prior knowledge or experience with online subject searching participated in the course. The primary purpose of the course was to introduce students to a library service which would enable them to perform research more expeditiously and provide them with relevant information for research projects. A series of different methods were employed to teach online searching, including a printed manual, a lecture, a case study, an audiovisual demonstration, and a small group assignment which culminated with observations of actual online searches. It is concluded from the results of the course that not only can high school students benefit from such a course, but also that they can be taught to form their own information searches in the future. (DMC)

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Teaching Online Bibliographic Searching to High School Students*

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by

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Online bibliographic searching has been in existence for twenty years. However, it has only been within the last ten years that it has been "economically feasible and publicly available in North America." (Wilks, 1982, p. 1). Subsequent to the establishment of the National Library of Medicine's Medical Literature Analysis and Retrival Service (MEDLARS) in the early 1960's, there was an approximate ten year period when no substantial public access systems were available. With the advent of more intelligent computers and the installation of sophisticated telecommunications networks, the gap was successfully bridged. Currently there are over 1,878 databases employed in online searching. (Directory of Online Databases, Fall 1983, p. 5). Whereas the majority are accessible to the public through large academic and public libraries, several, such as those provided by Reader's Digest, Bibliographic Retrieval Services (BRS) and Dialog, can be searched via home computer.

Accompanying the geometric progression of databases has been an increase in the number of online searches performed. For example, in 1974, there were 700,000 online searches executed. By 1979, this number had increased to an estimated four million and by 1981 to an estimated six million. (Hall, 1983, p. 23). With an increase of this magnitude, it would seem timely to commence initiating high school students to the concepts and fundamentals of online bibliographic searching, especially if they are college bound.

This paper will describe how four classes of high school students were introduced during the past two years to the concepts and terminology of online bibliographic searching, were instructed to formulate their own search strategies

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and received the opportunity to observe their execution by a skilled searcher on various selected databases. It will also examine and evaluate the methods employed and the students' achievement level responses to the course.

Over a two year period, sixty-seven students participated in the course. All were seniors at University High School and all were college bound. None had previous knowledge or experience with online subject searching, but many had searched on the University of Illinois Library's Computer System (LCS) for authors and titles and thus were acquainted with some computer terms and interactive descriptions. They participated in the course as part of research preparation for the following debate topics: (1) Capital Punishment; (2) Censorship in Education; (3) Conventional Arms Sales; (4) Defense Spending Budget; (5) Disarmament; (6) Federal Aid to Private Schools; (7) Genetic Engineering; (8) Gun Control; (9) Immigration; (10) Insanity Plea; (11) Leasing of Public Lands; (12) Military Aid to El Salvador; (13) Nuclear Power; (14) Socialized Medicine; (15) Space Budget; (16) Voluntary, Active Euthanasia; and (17) Withdrawal from the U.N.

Groups of four to five students were assigned one of these topics with affirmative and negative positions being designated. As part of their assignment, they were required to cite approximately fifty bibliographic references supporting their particular aspect of their subject. Library materials were to include books, periodicals, reports and newspapers. Topic research began in September, accompanied by instruction concerning citation format, notetaking and outlining and organizing of subject matter. The first brief was due in December. The final brief, which was required to be twenty to thirty pages in length, was due at the end of March. These briefs, combined with a twenty minute oral argument, constituted the project. The first year, the course in online bibliographic searching was taught in January. It was thought that by then the students would be more knowledgeable about research strategy, bibliographic terms

and their topic, and would thus receive optimal benefits for narrowing and initiating the next phase of their research efforts. However, the results of the first year searches yielded some duplicative material, so November was chosen the second year. This time period did not result in any redundant material being found.

I. PURPOSE

The primary purpose for teaching online bibliographic searching was to introduce students to a library service which would enable them to perform research more expeditiously and provide them with relevant information regarding their debate topics.

The course objectives were as follows-- After completing the course, the end-user should:

1. Possess a basic understanding of what online searching is.

2. Be cognizant of relevant online searching terminology, including Boolean operators, access points and limiting functions.

3. Be aware of the variety of available databases and comprehend the selection process.

4. Have a rudimentary knowledge of the thesauri and indexes which are used in the preliminary stages of search strategy formulation.

5. Be able to posit a tentative search strategy in terms of Boolean logic upon directed topics in preparation for actual online searching.

6. Be able to correctly interpret a bibliographic record and evaluate the results received.

7. Observe the execution of their search strategy on a selected database.

8. Utilize some of the citations as research for their debate topics.

9. Be knowledgeable regarding the advantages and disadvantages of online searching.

II. COURSE DESCRIPTION

A series of different methods were employed to teach online searching, including a printed manual, a lecture, a case study, an audiovisual demonstration and a small group assignment which culminated with observations of actual online searches. Prior to the lecture, each student was given a printed manual prepared by the Librarian and Graduate Library Assistant. The manual contained an annotated list of thirty searching terms, eighteen selected databases, a case study, examples of ideal and actual search strategies, a sample bibliographic record, a pre-search preparation form and a list of the advantages and disadvantages of online searching.

During the introductory lecture, students were supplied with a basic definition of online searching which distinguished it from the less complex online catalog at the University of Illinois, so that they would not view the two as interchangeable. Examples were provided to illustrate the specialized subject searching permitted in various databases as well as the additional salient characteristics, types of searches, multiple search terms, coverage and limiting functions of particular files. Students were informed of the rapid proliferation of databases and of the concomitant need to select appropriately. Relevant search terms, such as dictionary file, descriptor, thesaurus, search strategy, Boolean logic, hits and bibliographic record were defined or explained, along with the location method employed by the computer to retrieve information. The need for a well-defined search strategy was stressed, and a brief description was given of the symbols printed out in a bibliographic citation. After reviewing computer terminology, students read a hypothetical case study which presented the optimum conditions for performing an online search. The student: (1) had a well-defined search topic; (2) had already completed some preliminary research; and (3) had made decisions

regarding the types of information and time frame desired.

Using the hypothetical topic "adolescent suicide," students studied an instructor-designed "ideal" search strategy based upon the needs of the student in the case study. At this point, examples of the expanding and narrowing uses of the Boolean operators AND/OR were demonstrated. Since the selected database was ERIC, a search was made of the ERIC thesaurus, so that computer compatible descriptors could be chosen. After discussing the potential problems in the ideal search, the results of an actual, performed search on ERIC were shown in sequence by the use of transparencies on an overhead projector. Students had the opportunity to observe firsthand the number of hits or matches when a set of terms was inputed. They were given time to ask questions regarding the logic of each step and were shown the points at which the searcher would have required decisions of them. They were also supplied with the log on and log off times and apprised of the approximate cost of the search. The price ranges of various files were mentioned, and the need for a well-defined search strategy and efficient use of the database was reemphasized. A sample citation or bibliographic record was reviewed in the manual, so that students would be able to correctly interpret their own future search results.

Students were then acquainted with the advantages and disadvantages of doing an online search. Advantages: (1) the user is capable of imposing several search parameters simultaneously; (2) an online search is much faster than a manual search; (3) an online search is more often accurate, since there is no opportunity of overlooking citations or making errors when copying references from printed indexes; (4) a search strategy can be saved and re-executed in several databases; and (5) the updating of an online index is sometimes completed sooner than its printed counterpart. Disadvantages: (1) it is not effective to peruse entries while online; (2) the user is actually charged a

fee for online searching; and (3) it is not always possible to perform a long range retrospective search online. You must often request that the search be performed at the computer site, with the results either being mailed to you or printed on a terminal the following day. (Fenichel and Hogan, 1981).

Following this review, students were instructed to meet with other members of their respective debate groups for the purposes of selecting an appropriate database and formulating a written pre-search strategy. The databases from which they could chose consisted of: Alcohol Use/Abuse; Druginfo; ERIC; National Clearing House for Mental Health; Sociological Abstracts; Magazine Index; National Newspaper Index; Newspaper Index; PAIS International; BIOSIS Previews; Environline; Federal Energy Data Index; Medline; SCISEARCH; Congressional Informational Services; Historical Abstracts; National Criminal Justice Center; National Technical Information Service; and the Monthly Catalog.

Students were also provided with the requisite database thesauri. In many instances, however, the selected file only employed Library of Congress subject headings. These volumes were made available to them. Database selection guidance was given by the Librarian, but, in order to simulate reality, no instructor based selection was made. Students were supplied with an annotated list of databases and were made cognizant of the technical versus general nature of each.

Once files were selected, students began narrowing their research topics and concentrating on the isolation of pieces of information which were still necessary for particular aspects of the debate. Instruction was provided to each group regarding the employment of Boolean operators, truncation and logical sequence. The search strategies were collected and appointments were made for the actual online search observations. Prior to meeting with the searcher, students selected one member of each group to serve as an arbitrator for deciding limiting functions, the number of offline prints and the subject

direction of the search. The following databases were selected and searched: Congressional Informational Index; ERIC; Magazine Index; Medline; National Criminal Justice Center; National Newspaper Index; PAIS International; Environline; and the Monthly Catalog. Students attended the execution of their selected searches and observed the necessary interaction between the searcher and each patron. They made decisions about pursuing particular chains of steps or aborting them. They received several citations for immediately continuing research and decided how many to have printed offline and mailed to them.

The course concluded with a brief description of the future trends in online searching. Students were informed that printed indexes may become outmoded by an online format. They were told that some database with no paper equivalents already exist. They heard that searching languages will become simpler and that in the future they will be able to retrieve their own data. They were finally informed that people will have their own computers, will open accounts with bibliographic utilities, and will perform homebased online searching. (Fenichel and Hogan, 1981).

III. EVALUATION

An evaluation of "Teaching Online Bibliographic Searching to High School Students" was achieved by an analysis of the following data:

1. Student course evaluations.
2. Student test results.
3. Direct observation of how student searches were performed.

IV. COURSE EVALUATION RESPONSES

Students were asked to complete a ten question evaluation form. (The overall results are included in Table 1.) More than 87% of the respondents indicated that the course had provided them with an understandable introduction to online bibliographic searching. Over 97% thought that the material had been presented in an understandable manner. The vast majority thought that they were able to comprehend the relevant terminology and could formulate an effective search strategy. More than 90% of the students thought that they could interpret a computerized bibliographic record, and more than 97% concluded that they could recognize the advantages and disadvantages of online searching.

TABLE 1

ON LINE BIBLIOGRAPHIC SEARCHING EVALUATION

	YES	DON'T KNOW	NO
1. This course provided an adequate introduction to online bibliographic searching:	87.2%	8.1%	4.7%
2. The material was presented in an understandable manner:	97.1%	2.9%	0.0%
3. The course provided a basic understanding of the relevant terminology:	80.2%	11.3%	8.5%
4. The course enabled me to understand the translation process from natural language to thesaurus terms:	72.6%	19.6%	7.8%
5. The course taught me how to formulate a search strategy tailored to my debate topic:	73.3%	12.4%	14.3%
6. I used at least one of the online citations in my debate bibliography:	30.2%	54.0%	15.8%
7. The course provided me with an opportunity to observe an actual online search at the University of Illinois Library:	93.0%	2.8%	4.2%

8. The course taught me how to interpret a bibliographic record printed out by the computer:	91.4%	0.0%	8.6%
9. The course discussed the advantages and disadvantages of online searching:	97.2%	2.8%	0.0%
10. A successful online search can significantly enhance one's research efforts:	84.2%	15.8%	0.0%

COMMENTS:

V. TEST RESULTS

The results of the post-course examination, which was employed to measure the students' actual comprehension of online searching, substantiated their evaluative beliefs. (The examination questions are included in Table 2.) Sixty-three percent of the students scored between 90 and 100%, while an additional thirty-five percent received grades between 80 and 89%. In total, ninety-eight percent of the students had scores in excess of 80%.

TABLE 2

STUDENT TEST

I. Terminology

Directions: Place the letter of the term which corresponds to the correct definition in the space provided.

A. Controlled vocabulary	_____an indexing term used to describe the content of a document, i.e., a subject heading
B. Descriptor	
C. Boolean operators	_____a one-time search in a database which covers a given time period
D. Thesaurus	
E. Online	_____The process of having the computer execute a search after the searcher has given all instructions and is no longer interacting with the computer
F. Hits	
G. File	_____the collection of terms which constitutes an authoritative list of descriptors which are assigned to items in the database
H. Offline	
I. Retrospective	

J. Password

_____ the logical operators AND, OR, NOT used to create search logic

_____ use of a terminal which permits the user to interact with the computer

_____ an identification code assigned to user when accessing information on the computer

_____ the number of records contained in a set. May also be called items or postings

II. Selection of Appropriate Databases (A copy of the list of selected databases printed in the manual was made available for this part of the test.)

Directions: In this part, you are to select the database which will give you the most information about the subject. Write the name of the database you have chosen in the space provided. In some instances, more than one database is possible.

1. You need information about air pollution caused by automobile emissions.

   Datebase: _____

2. Find information about the success of pilot programs involving the counseling of teenage alcoholics. (More than one database is possible.)

   Datebase: _____

3. Locate some scholarly articles about Anne Boleyn, the second wife of Henry VIII.

   Database: _____

4. You need to find information about test tube babies. (More than one database is possible.)

   Database: _____

5. Find 5 newspaper articles which document the assassination attempt upon the life of President Reagan. (More than one database is possible.)

   Database: _____

III. Search Strategy Formulation

Directions: Formulate a search strategy for each of the topics given below, using the underlined words as your descriptors. Use logical operators AND and OR in order to effectively combine the terms. Assume that the choice of an appropriate database has already been made.

1. Ed is a student at a culinary institute. He needs some recipes for preparation of noodles. Specifically, he needs information on Chinese, Italian, Japanese noodles. Diagram a strategy for him.

2. Mary is enrolled in an education course at the University, and is doing a project on bilingualism in Canada. Specifically, she needs information on bilingual curriculum or education programs in Montreal, Canada. Devise a strategy for her.

IV. Citation Interpretation

This is a computer printout of a citation from the ERIC database.

3
AN EJ255876.
AU SMITH, ELSIE.
TI ADOLESCENT SUICIDE: A GROWING PROBLEM FOR THE SCHOOL AND FAMILY.
SO URBAN EDUCATION V16 N3 P279-96 OCT 1981. Oct81.
YR 81.

Directions: List the following parts of the citation:

Author: _____

Title of Article: _____

Journal Title: _____

Volume no.: _____

Page numbers: _____

Month and year: _____

V. Disadvantages and Advantages of Online Searching

Sue is going to make a class presentation about the recent giant panda born in captivity. She has one week to complete her research.

Directions: List 5 advantages and/or disadvantages of a giant panda online search.

VI. OBSERVATIONS

All of the students who participated in online bibliographic searching seemed to be gratified with the results they received. Comments on the student evaluation forms indicated that many intended to request a search for future class research assignments. All seemed to enjoy observing the actual search process. Several commented that they only wished that they could have "done the actual searching without the assistance of a librarian." Students who took

the course in January suggested that it be introduced earlier in the year. This recommendation was acted upon the second year, when the course was taught in November. All of the participants indicated that they were pleased to have been introduced to online bibliographic searching before their entrance into college.

VII. DISCUSSION AND CONCLUSION

At the time of this instruction, there had been only one other paper published regarding the use of online searching with high school students. (Wozny, Fall 1982). Since that time, BRS and DIALOG (two major vendors of online searching services) have marketed respectively BRS/After Dark and DIALOG's Knowledge Index which enable microcomputer owners to search various databases during evening hours at reduced rates. This new service, using a modified query command structure, effectively nullifies the use of an intermediary searcher and the need for a library based database. (Tenopir, March 1, 1983). Obviously, the time has come to make college bound high school students aware of this library and potentially homebased service. Beginning next Fall, Clarkson College of Technology in Potsdam, New York, and Drexel University in Philadelphia, Pennsylvania, will both require incoming first year students to purchase personal computers for use in their academic work. "Carnegie-Mellon University in Pittsburgh, Pennsylvania has recently signed an agreement with IBM to develop what will be the largest network of personal computers in the world. This complex, scheduled to go on-line in 1985, will connect all parts of the campus and pervade every aspect of college study and life." (Futurist, April 1983, p. 3).

If these events are any portent of the future, it would seem imperative that high school librarians initiate some form of classroom or computer-assisted

instruction for college bound students. This paper described a successful methodology which combined classroom instruction with direct observation. The results were significant. Over 87% of the students thought that the course had provided an adequate introduction to online searching. No less than 98% of them had scores in excess of 80% on the post-course examination. These positive results would appear to indicate not only that high school students can benefit from such a course, but also that they can be taught to form their own information searches in the future.

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